**Enteric Nonenterics (Enteric family but NOT enteric location)**

Bacteria → Gm- → Rod → Facultative → Escherichia, Shigella, Salmonella, Klebsiella, Proteus, Yersinia

* Motile via flagella | facultative aerobic – ferment glc w/ CO2 production
* Characterized by serology
  + H – flagella | K – Capsule | O – polysaccharide comp. of LPS/LOS
* Responsible for 1/3 of all bacteremia + 2/3 of all UTIs
* Neonatal Bacterial Meningitis
  + Group B Streptococcus | E. coli | Listeria monocytogenes
  + Most common in 1st month in 15% of neonates w/ bacteremia
  + Diagnostic: Full, but not bulging, fontanelle
  + Early onset (1st 5-7 days) – probably due to vertical transmission
  + Late onset (after 1st week) – nosocomial or community acquired infection

**Escherichia coli K1**

* Pathogenesis

1. Mucosal Colonization
2. Bloodstream invasion
3. Multiplication → High-level bacteremia
4. Crosses BBB (unique to E. coli K1)
   1. Binds through ligand-R interactions
   2. Host cytoskeletal rearrangements
5. Invasion of CNS
6. Neonatal injury

* Virulence Factor: K1 capsule binds Factor H → blocks alternative complement pathway
* D: ↑ CSF WBCs | ↑ CSF protein | ↓ CSF glucose
* T: IV Broad-spectrum cephalosporins + aminoglycosides

**Uropathogenic E. Coli (UPEC)**

* Epi: Women more susceptible to UTIs due to anatomical/geographical reasons
* Clinical Symptoms
  + Cystitis (95%)
    - Uncomplicated bladder infection
    - Burning sensation | Frequent micturition | Incomplete voiding
    - Transmission: Fecal-Oral | Sexual
  + Pyelonephritis (5%)
    - Kidney infection | Chills | high fever | N | Arthralgia/Myalgia
    - If untreated → renal failure | bacteremia | septic shoch
* Pathophysiology

1. Several adhesions bind (pili) to avoid being voided
2. Invade the superficial facet cells in bladder
   1. Cause apoptosis | Remain dormant | Launch future recurrent episodes

* Virulence Factors: Siderophores | Toxins such as α-hemolysin (alters signaling cascades, triggers apoptosis)

**Proteus mirabilis**

* Hyperflaggelated | Produce Urease → formation of stones w/ calcium phosphate + uric acid + bacteria

**UPEC + P. mirabilis**

* D: urine dip stick (non-specific for UTI) | Immersion culture (requires 24hr)
* T: β-lactams | Trimethoprim-sulfamethoxazole | FQs
  + Aminoglycosides in serious/complicated infections
  + Cranberry juice only modestly works prophylactically

**Klebsiella pneumonia**

* Ubiquitous in environment | K1 serotype is particularly pathogenic
* Sym: Pneumonia | UTI | Wounds | Ocular/Neurological problems | STDs → granuloma inguinale
  + High mortality rate
* VF: Capsule (major) | LPS
* D: Symptoms | Postive chest X-ray (bronchopneumonia) | Positive blood + sputum cultures (non-motile)
* T: ES β-lactam | New cephalosporin w/ aminoglycosides (dependent on resistance pattern)

**Yersinia pestis**

* V: Oriental rat flea (Xenopsylla cheopis)
* Sym: Buboes (swollen lymph nodes) | Necrosis (2nd to DIC)
  + High mortality
* Pathophysiology

1. 1st 36 hours → Rapid bacterial replication w/o huge inflammation response
   1. Occurs via a dominant, local anti-inflammatory state eraly in lung infection
2. Immune system fully activates, but too late to control infection
3. High-level bacteremia ensures transmission back to flea without killing host
   * Doesn’t follow trade-off hypothesis

* VF: Lipid A – inhibits TLR 4 activation | Antiphagocytic protein capsule (F1) – unique b/c made of protein
* Diagnosis
  + Utilize non-motility at all temperatures as determining factor
  + PCR-based tests
  + Wright stains (only stains granules on bacterium ends)
  + Direct fluorescent Ab assay for F1 glycoprotein
* T: Streptomycin | Doxycycline for prophylaxis